Tripura Board
Class X
Mathematics
Sample Paper 1

Time allowed: 3 hours   **Maximum Marks: 80**

General Instructions:
1. All questions are compulsory.
2. The question paper consists of 27 questions which have been divided into four groups- A, B, C and D. Group A contains 3 questions of 1 mark each, Group B contains 5 questions of 2 marks each. Group C contains 9 questions of 3 marks each and Group D contains 10 questions of 4 marks each.
3. There are three questions for internal choice one in Group C and two in Group D.
4. Use of calculator is not permitted.

Group-A

Answer the following question: -   **1x3=3**

1. Express 264 as a product of its prime factors:

2. What is the geometrical meaning of the zeros of a polynomial?

3. In which quadrant do the following points lie? A (-3, 5) B (-2, -7)

Group-B

Answer the following question: -   **2x5=10**

4. α, β are the roots of the quadratic polynomial p (x) = x^2 - (k + 6)x + 2 (2k - 1). Find the value of k, if $\alpha + \beta = \dfrac{1}{2}\alpha\beta$.

5. Use Euclid's division algorithm to find H.C.F. of 870 and 225.

6. In the given figure, AT is a tangent to the circle with centre O. Find the length of AT.
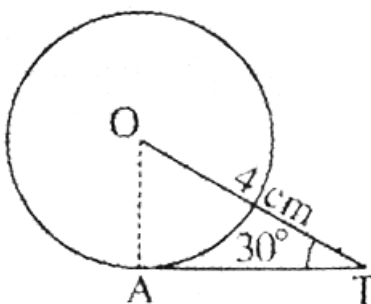
7. An umbrella has 10 ribs which are equally spaced. Assuming the umbrella to be a flat circle of radius 40 cm, find the area between two consecutive ribs of the umbrella.

8. The angle of depression of a car parked on the road from the top of a 150 m high tower is 30°. Find the distance of the car from the tower (in metres).
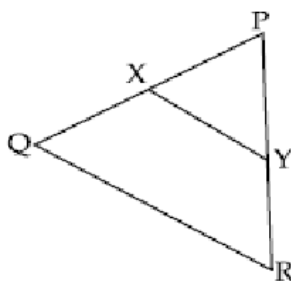
Group-C

Answer the following questions: -   3x9=27

9. Prove that: $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}} + \sqrt{\frac{\sec\theta+1}{\sec\theta-1}} = 2\cos ec\theta$

10. A park with flower plants is to be developed within a quadrilateral with points A(0, −1), B(6, 7), C(−2, 3) and D(8, 3) as vertices and AB and CD as diagonals. Show that AB and CD bisect each other and $AD^2 + DB^2 = AB^2$. Find the area of the park. (All distances are in km)

11. Check whether the equation $6x^2 – 7x + 2 = 0$ has real roots, if yes, find them by completing the squares method.

12. For what values of a and b does the following pairs of linear equations have an infinite number of solutions:
    2x + 3y = 7; a (x + y) - b (x - y) = 3a + b − 2

13. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.

14. A leading library has a fixed charge for the first three days and an additional charge for each day thereafter. Bhavya paid Rs. 27 for a book kept for seven days, while Vrinda paid Rs. 21 for a book kept for five days. Find the fixed charge and charge for each extra day.

15. Find the ratio in which the line segment joining the points A(3,- 3) and B(- 2, 7) is divided by x-axis. Also find the coordinates of the point of division.

16. If mean of the following data is 86, then what is the value of p?

Wages (in Rs.)	50-60	60-70	70-80	80-90	90-100	100-110
Number of worker	5	3	*4*	p	2	13

17. In the figure, XY || QR, $\dfrac{PQ}{XQ} = \dfrac{7}{3}$ and PR = 6.3 cm. Find YR.

Or

Find the value of $\dfrac{5\sin^2 30° + \cos^2 45° - 4\tan^2 30°}{2\sin 30° \cos^2 30° + \tan 45°}$.

Group-D

Answer the following questions: -   **4x10=40**

18. Draw a triangle ABC with side BC = 6 cm, $\angle C = 30^o$ and $\angle A = 105^o$. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of Δ ABC.

19. The interior angles of a polygon are in A.P. The smallest angle is $52°$ and the common difference is $8°$. Find the number of sides of the polygon.

20. In triangle ABC, D is the mid-point of BC and AE $\perp$ BC. If AC > AB, then show that: $AB^2 = AD^2 - BC \times DE + \frac{BC^2}{4}$.

21. Solve the equations $2x - y + 6 = 0$ and $4x + 5y - 16 = 0$ graphically. Also determine the coordinate of the vertices of the triangle formed by these lines and the x-axis.

22. The angle of elevation of a cloud from a point 60 metres above a lake is $30°$ and the angle of depression of the reflection of the cloud in the lake is $60°$. Find the height of the cloud.

23. A lead pencil consists of a wood cylinder with a solid cylinder of graphite fitted into it. The diameter of the pencil is 7 mm. The diameter of the graphite is 1 mm and length of the pencil is 10 cm. Calculate the weight of whole pencil in grams if the density of the wood is 0.6 gm/ cm^3 and of graphite 2.3 gm/ cm^3.

24. The area enclosed by the circumferences of two concentric circles is 346.5 cm^2. If the circumference of the inner circle is 88 cm, calculate the radius of the outer circle.

25. For the data given below draw less than ogive curve.

Marks	0 - 10	10 - 20	20 – 30	30 - 40	40 - 50	50 – 60
Number of students	7	10	23	51	6	3

26. Find the area of triangle formed by joining the mid-points of the sides of triangle whose vertices are (0, -1), (2, 10) and (0, 3). Find the ratio of this triangle with given triangle.

Or

Draw the graph for the following equations:

y - x = 1

x + y = 3

Solve for x any y using this graph. Shade the region bounded by the two lines and the line y = 0.

27. Two persons jog together from the same point and in the same direction. One takes 12 minutes to jog one round while the other takes 18 minutes. After how many minutes will they meet first together at the starting point?

Or

A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm, respectively. Find the capacity and surface area of the bucket. Also, find the cost of the milk which can completely fill the container, at the rate of Rs. 25 per litre (use Π = 3.14).